

How the USDA Changed the Way Women Farmers are Counted in the Census of Agriculture

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Overview

For researchers studying demographic trends in farming, the number of women participating in agriculture in the United States has posed a series of contradictions. On the one hand, results from the U.S. Department of Agriculture (USDA) Census of Agriculture have suggested a sharp increase in women working as farmers. For example, in a report from the 2012 Census, researchers announced that “nearly 1 million women are working America’s lands. That is nearly a third of our nation’s farmers. Together, these women are generating \$12.9 billion in annual agricultural sales” (<https://newfarmers.usda.gov/women-in-ag>). And yet, using the same data, other researchers have suggested that women’s participation in farming is much smaller, perhaps even shrinking, noting that “farms with women principal operators decreased 6 percent between 2007 and 2012” accounting for just “3 percent of sales” and merely “14 percent of the nation’s...principal operators.”

These contradictions are a result of complicated and, at times, confusing terminology used in the Census of Agriculture. They are also the result of changes in how data about farmers have been collected from one census to the next. This article attempts to bring needed clarity to the nature of the data collected in the Census of Agriculture. We aim to help researchers, journalists, and policy makers make more accurate claims about the demographics of U.S. farmers, especially concerning sex.

An example elucidates the importance of these changes over time. Imagine a farm in 1978 run by two generations of a family. Both are married, heterosexual couples: a mom and dad plus a son and a daughter-in-law. In 1978, one person—likely the father—would be listed as the “farm operator.” For the first time, we can know the sex of that farmer and begin to have data on the gender of farmers in the United States. Each time the census is sent to that farm through 1997, a single person is reported as the farm operator, and we have

access to the demographic data (including age, race, sex, and Hispanic origin) on that farmer. The aging of the farming population became a major concern precisely because of these new Census data gave us better insights into farmer demographics.

However, starting in 2002, the census changes and allows for up to three operators. In the family listed above, they would likely register “dad,” “mom,” and “son” as the “farm operators” and continue to select the father as the “principal operator.” However, in 2017, that same family could list all four of the members as “farm operators” and—most importantly—could select up to all four as “principal producers.” Therefore, this farm might list dad, mom, son, and daughter-in-law as farm operators and dad, mom, and son as principal producers. This change in how the data were collected makes it appear that there were more women operators, and more women principal producers, on the farm, while in reality, the mom and daughter-in-law could have been contributing to the farm in exactly the same way for decades. In addition, these changes make it appear that the average age of the farmers on has farm decreased. It is worth noting that more and younger farmers are both politically popular findings. Thus, it seems that significant demographic shifts took place between 2012 and 2017 on this farm when in actuality, no shift took place—rather, data collection became richer and more accurate.

This clarification—including Table 1, which outlines various terms used and changes made in the Census of Agriculture over the years—will help researchers and other constituencies use census data to make more knowledgeable comparisons over time, especially concerning women’s participation in U.S. agriculture. As this paper will explain, the complexities of the data collection and organization used in the Census of Agriculture make accurate comparisons from the 2017 Census of Agriculture about the number of women farming in the United States nearly impossible.

Table 1. Overview of Changes to Demographic Data on the USDA Census of Agriculture

Census Year	Gender Is a Variable	No. of Farm Operators Possible	No. of Principal Operators Possible	Married to Principal Operator Is a Variable
1974		1	1	
1978	X	1	1	
1982	X	1	1	
1987	X	1	1	
1992	X	1	1	
1997	X	1	1	
2002	X	3	1	
2007	X	3	1	
2012	X	3	1	X
2017	X	4	1–4 ^a	X

Notes: Each year in the Census Year column hyperlinks to a document containing the questionnaire/report form for that year's Census of Agriculture.

^a In 2017 "Principal Operator" was replaced by "Principal Producers."

The History of Demographic Questions, Farm Operator, and Principal Farm Operator

Box 1. Defining "Farm Operator" and "Principal Farm Operator"

One of the most common issues with the reporting of data by journalists and researchers is a misunderstanding of the terms "farm operator(s)" versus "principal farm operator(s)." The USDA definition of these terms does not clearly distinguish a difference, defining both under a single heading, "Farm Operator and Principal Farm Operator." The USDA notes that a farm operator is "the person who runs the farm, making day-to-day management decisions... In the case of multiple operators, the respondent for the farm identifies the principal farm operator during the data collection process" (USDA, 2019, paragraph 3). In other words, the census does not clearly define the difference between a farm operator and a principal farm operator, merely stating that in the case of multiple operators, the farm should select one farmer as the "principal" for the purpose of data collection.

While race had been a variable on the Census of Agriculture since 1900, gender and Hispanic ethnicity only became variables starting in 1978. From 1978 through 1997, the Census of Agriculture allowed only one "farm operator" for each farm or ranch in the United States. Hence, the number of farmers and the number of farms was a 1:1 ratio, making it relatively easy to compare operators' demographics across time.

Starting in 2002 and continuing in 2007 and 2012, the census allowed for up to three "farm operators" to be listed for every farm (see Figure 1). Each farm was required to designate one operator as the "principal" operator. Therefore, while the number of farm operators

listed in the census rapidly increased in this period, the "principal operator" for each farm remained a 1:1 ratio. This explains the seeming contradiction that in 2012, women were *both* 14% of principal farm operators and 33% of U.S. farmers and ranchers.

Another essential addition to the 2012 Census was a question asking whether either of the two "non-principal" farmers was married to the principal—for the first time, the marital status of two farmers on the same farm could be determined. This question was repeated in the 2017 Census, which—combined with the legalization of same-sex marriage in 2015—made it possible for the first time to determine (albeit in a limited way) a proportion of LGBT farmers by identifying "women married to women" and "men married to men" operators as long as they worked on the same farm.

The most significant and challenging changes in the data to understand are those from the 2017 Census, which make a direct comparison between this census and the 2002-2012 Censuses very difficult. Starting in 2017, respondents could list up to four farm operators per farm (see Figures 2 and 3), an increase from the previously allowable three farm operators per farm. Thus, the number of farm operators increased from 3,180,074 in 2012 to 3,399,834 in 2017, while the number of farms decreased from 2,109,303 to 2,042,220 in the same period. Additionally, starting in 2017, on any one farm, zero to four of those operators could be selected as a "principal operator." This completely altered the nature of this variable, which for decades had indicated one single principal operator per farm. In other words, in the 2017 Census, a single farm might have four "farm operators" (versus three previously), and any or all of those operators could also be listed as a "principal operator." As such, the term "principal operator" is not interchangeable across the 2017 and previous Censuses.

Figure 1. 2012 USDA Census of Agriculture Operator Characteristics Questionnaire

SECTION 35 OPERATOR CHARACTERISTICS

1. In 2012, how many operators (individuals) were involved in the day-to-day decisions for this operation? Enter the number of operators and the number of women operators. Exclude hired workers unless they were a hired manager or family member. . . . 1575

Total Number of Operators	
1574	

Number of Women Operators	
1574	

2. Answer the following questions for up to three primary operators of this operation as of **December 31, 2012.**

	Principal Operator or Senior Partner	Operator 2	Operator 3
a. Full name	1835 <input style="width: 100%;" type="text"/>	1852 <input style="width: 100%;" type="text"/>	1872 <input style="width: 100%;" type="text"/>
b. Sex of operator	0926 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1586 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1597 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female
c. Is operator 2 or 3 the spouse of the principal operator?	1590 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1601 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1601 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
d. At which occupation did the operator spend the majority (50 percent or more) of his/her worktime in 2012?	0928 Mark one answer only. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other	1580 Mark one answer only. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other	1591 Mark one answer only. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other
e. Is this operator retired?	0924 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1582 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1593 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
f. How many days did the operator work off the farm in 2012? Include days in which the operator worked at least 4 hours per day in an off-farm job. Include work on someone else's farm for pay.	0929 Mark one answer only. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1831 Mark one answer only. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1931 Mark one answer only. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more

	Principal Operator or Senior Partner	Operator 2	Operator 3
g. Did the operator live on this operation at any time in 2012?	0923 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1581 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1592 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
h. In what year did the operator begin to operate any part of THIS operation?	0930 <input style="width: 100%;" type="text"/>	1584 <input style="width: 100%;" type="text"/>	1595 <input style="width: 100%;" type="text"/>
i. What year did the operator begin to operate ANY farm?	1834 <input style="width: 100%;" type="text"/>	1851 <input style="width: 100%;" type="text"/>	1871 <input style="width: 100%;" type="text"/>
j. What was the operator's age on December 31, 2012?	0925 <input style="width: 100%;" type="text"/> years	1585 <input style="width: 100%;" type="text"/> years	1596 <input style="width: 100%;" type="text"/> years
k. Is the operator of Spanish, Hispanic, or Latino origin or background, such as Mexican, Cuban, or Puerto Rican, regardless of race?	0927 Spanish, Hispanic, or Latino origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1587 Spanish, Hispanic, or Latino origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1598 Spanish, Hispanic, or Latino origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
l. What is the operator's race?	1701 <input type="checkbox"/> White 1702 <input type="checkbox"/> Black or African American 1703 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe <input style="width: 50px;" type="text"/> 1733 <input style="width: 100%;" type="text"/> 1705 <input type="checkbox"/> Asian 1704 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	1801 <input type="checkbox"/> White 1802 <input type="checkbox"/> Black or African American 1803 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe <input style="width: 50px;" type="text"/> 1833 <input style="width: 100%;" type="text"/> 1805 <input type="checkbox"/> Asian 1804 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	1901 <input type="checkbox"/> White 1902 <input type="checkbox"/> Black or African American 1903 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe <input style="width: 50px;" type="text"/> 1933 <input style="width: 100%;" type="text"/> 1905 <input type="checkbox"/> Asian 1904 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander
m. How many people lived in the operator's household in 2012?	1577 <input style="width: 100%;" type="text"/> number	1589 <input style="width: 100%;" type="text"/> number	1600 <input style="width: 100%;" type="text"/> number

Source: [U.S. Department of Agriculture \(2012\)](#).

Figure 2. 2017 USDA Census of Agriculture Operator Characteristics Questionnaire Part 1

SECTION 7 PERSONAL CHARACTERISTICS		Men		Women	
1. In 2017, how many men and women were involved in decisions for this operation (include family members and hired managers)? Exclude hired workers unless they were a hired manager or family member. 1571		<input type="text" value="1571"/>		<input type="text" value="1574"/>	
2. Answer the following questions for up to four individuals who were involved in the decisions for this operation as of December 31, 2017.					
	Person 1	Person 2	Person 3	Person 4	
	1836	1852	1872	1873	
a. Full name	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
b. Is this person completing this form?	1610 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1611 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1612 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1613 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	
c. Sex	1926 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1586 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1597 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1614 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	
d. What was this person's age on December 31, 2017?	1925 <input type="text"/> age	1585 <input type="text"/> age	1596 <input type="text"/> age	1615 <input type="text"/> age	
e. Is this person of Hispanic, Latino, or Spanish origin?	1927 Hispanic, Latino, or Spanish origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1587 Hispanic, Latino, or Spanish origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1598 Hispanic, Latino, or Spanish origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1622 Hispanic, Latino, or Spanish origin 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	
f. Race	Mark one or more. 2701 <input type="checkbox"/> White 2702 <input type="checkbox"/> Black or African American 2703 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe ↴ <input type="text"/> 2705 <input type="checkbox"/> Asian 2704 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	Mark one or more. 1801 <input type="checkbox"/> White 1802 <input type="checkbox"/> Black or African American 1803 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe ↴ <input type="text"/> 1805 <input type="checkbox"/> Asian 1804 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	Mark one or more. 1901 <input type="checkbox"/> White 1902 <input type="checkbox"/> Black or African American 1903 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe ↴ <input type="text"/> 1905 <input type="checkbox"/> Asian 1904 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	Mark one or more. 1616 <input type="checkbox"/> White 1617 <input type="checkbox"/> Black or African American 1618 <input type="checkbox"/> American Indian or Alaska Native. Specify tribe ↴ <input type="text"/> 1620 <input type="checkbox"/> Asian 1621 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander	
g. At which occupation did this person spend the majority (50 percent or more) of his/her worktime in 2017?	1928 Mark one. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Work other than farming or ranching	1580 Mark one. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Work other than farming or ranching	1591 Mark one. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Work other than farming or ranching	1623 Mark one. 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Work other than farming or ranching	
h. Is this person retired from farming or ranching?	1924 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1582 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1593 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1624 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	
i. How many days did this person work off the farm in 2017? Include days in which the person worked at least four hours per day in an off-farm job. Include work on someone else's farm for pay	1929 Mark one. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1831 Mark one. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1931 Mark one. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1625 Mark one. 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	

Source: [U.S. Department of Agriculture \(2017\)](#).

Figure 3. 2017 USDA Census of Agriculture Operator Characteristics Questionnaire Part II

SECTION 7 CONTINUED –		Person 1, continued	Person 2, continued	Person 3, continued	Person 4, continued																																	
j. Did this person live on this operation at any time in 2017?	1923	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1581	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1592	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1626	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No																														
k. In what year did this person begin to operate any part of THIS operation?	1930	<input type="text"/>	1584	<input type="text"/>	1595	<input type="text"/>	1627	<input type="text"/>																														
l. In what year did this person begin to operate ANY farm operation?	2834	<input type="text"/>	1851	<input type="text"/>	1871	<input type="text"/>	1628	<input type="text"/>																														
m. Has this person ever served on active duty in the U.S. Armed Forces, Reserves, or National Guard?	1633	Mark one. 1 <input type="checkbox"/> Never served in the military 2 <input type="checkbox"/> Only on active duty for training in the Reserves or National Guard 3 <input type="checkbox"/> Now on active duty 4 <input type="checkbox"/> On active duty in the past, but not now	1634	Mark one. 1 <input type="checkbox"/> Never served in the military 2 <input type="checkbox"/> Only on active duty for training in the Reserves or National Guard 3 <input type="checkbox"/> Now on active duty 4 <input type="checkbox"/> On active duty in the past, but not now	1635	Mark one. 1 <input type="checkbox"/> Never served in the military 2 <input type="checkbox"/> Only on active duty for training in the Reserves or National Guard 3 <input type="checkbox"/> Now on active duty 4 <input type="checkbox"/> On active duty in the past, but not now	1636	Mark one. 1 <input type="checkbox"/> Never served in the military 2 <input type="checkbox"/> Only on active duty for training in the Reserves or National Guard 3 <input type="checkbox"/> Now on active duty 4 <input type="checkbox"/> On active duty in the past, but not now																														
	n. How many people lived in this person's household in 2017?	2577	<input type="text"/> number	1589	<input type="text"/> number	1600	<input type="text"/> number	1637	<input type="text"/> number																													
	o. Was this person hired and paid a salary or wages to manage this operation?	2576	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1588	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1599	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1641	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No																													
	3. Was this person involved in these specific decisions as of December 31, 2017? For each person and for each item, mark all that apply.	<table border="1"> <thead> <tr> <th></th> <th>Person 1</th> <th>Person 2</th> <th>Person 3</th> <th>Person 4</th> </tr> </thead> <tbody> <tr> <td>a. Day-to-day decisions</td> <td>1642 1 <input type="checkbox"/></td> <td>1643 1 <input type="checkbox"/></td> <td>1644 1 <input type="checkbox"/></td> <td>1645 1 <input type="checkbox"/></td> </tr> <tr> <td>b. Land use and/or crop decisions, including planting, crop spraying, or other, e.g., grazing</td> <td>1650 1 <input type="checkbox"/></td> <td>1651 1 <input type="checkbox"/></td> <td>1652 1 <input type="checkbox"/></td> <td>1653 1 <input type="checkbox"/></td> </tr> <tr> <td>c. Livestock decisions, including purchases, sales, breeding, and pasturing</td> <td>1654 1 <input type="checkbox"/></td> <td>1655 1 <input type="checkbox"/></td> <td>1656 1 <input type="checkbox"/></td> <td>1657 1 <input type="checkbox"/></td> </tr> <tr> <td>d. Record keeping and/or financial management</td> <td>1776 1 <input type="checkbox"/></td> <td>1777 1 <input type="checkbox"/></td> <td>1778 1 <input type="checkbox"/></td> <td>1779 1 <input type="checkbox"/></td> </tr> <tr> <td>e. Estate planning or succession planning</td> <td>1757 1 <input type="checkbox"/></td> <td>1758 1 <input type="checkbox"/></td> <td>1759 1 <input type="checkbox"/></td> <td>1760 1 <input type="checkbox"/></td> </tr> </tbody> </table>									Person 1	Person 2	Person 3	Person 4	a. Day-to-day decisions	1642 1 <input type="checkbox"/>	1643 1 <input type="checkbox"/>	1644 1 <input type="checkbox"/>	1645 1 <input type="checkbox"/>	b. Land use and/or crop decisions, including planting, crop spraying, or other, e.g., grazing	1650 1 <input type="checkbox"/>	1651 1 <input type="checkbox"/>	1652 1 <input type="checkbox"/>	1653 1 <input type="checkbox"/>	c. Livestock decisions, including purchases, sales, breeding, and pasturing	1654 1 <input type="checkbox"/>	1655 1 <input type="checkbox"/>	1656 1 <input type="checkbox"/>	1657 1 <input type="checkbox"/>	d. Record keeping and/or financial management	1776 1 <input type="checkbox"/>	1777 1 <input type="checkbox"/>	1778 1 <input type="checkbox"/>	1779 1 <input type="checkbox"/>	e. Estate planning or succession planning	1757 1 <input type="checkbox"/>	1758 1 <input type="checkbox"/>	1759 1 <input type="checkbox"/>
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e. Estate planning or succession planning	1757 1 <input type="checkbox"/>	1758 1 <input type="checkbox"/>	1759 1 <input type="checkbox"/>	1760 1 <input type="checkbox"/>																																		
4. Is this person a Principal Operator or Senior Partner?	1765	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1766	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1767	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1768	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No																														
5. Is this person the spouse of a Principal Operator or Senior Partner?	1769	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1590	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1601	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1773	1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No																														

Source: [U.S. Department of Agriculture \(2012\)](#).

This change in 2017 in the way that “principal operators” are counted was well-intentioned; it was envisioned as a way to create a more accurate presentation of the farms in the United States. As Beach (2013), Bell et al. (2004) and Brasier et al. (2014) note, women are much less likely to identify themselves as “farmers,” even when they are doing critical work on a farm. Thus, the 2017 data likely achieves its goal and is a better representation of farmer demographics and the composition of U.S. farms and ranches. However, this progress eliminates the ability to accurately estimate trends in the number of women operators and principal

operators in the United States over time using previous censuses. The result is that researchers, journalists, and policy makers must be cautious making claims comparing farmer demographics from the 2017 Census. In other words, we know that the way the data was collected changed, but we cannot necessarily see how the composition of U.S. farmers changed over this period. Therefore, we cannot know if the decline of women as both “operators” and “principal operators” in the 2012 Census of Agriculture—the first time this has happened since the Census began collecting demographic data about the sex of farmers in 1978—

Box 2. Suggestions for Accessing Primary Producer (2017) and Principal Producer (2002-2017) Data

There are three main ways to access USDA Census of Agriculture data:

- First, the USDA National Agricultural Statistics Service hosts an online Quick Stats tool that makes some summary statistics available to the public. There are two Quick Stats websites—an updated and more intuitive version for the 2012 and 2017 data (https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/1/table/1) and the original version, which has Census information for operators from 1997-2017 (<https://quickstats.nass.usda.gov/>). In the updated tool, you can access information for principal producers from the 2012 Census by choosing “2012 Census of Agriculture” in the top right drop-down menu. You may then choose your level of analysis (U.S./State or State/County), followed by the specific Census tables you want. Tables are produced by clicking “update grid.” Options that include principal producer characteristics are tables 55, 56, 58, 59, 60, and 62. These tables will give you data on demographics such as age and race as well as selected farm characteristics for women and minority principal operators (such as total acres operated, federal conservation receipts). You may also choose to see this data broken down by state or county using drop-down menus. The process is similar for the 2017 data, except that you can get information on both the principal (not comparable to 2012’s “principal”) and primary (more comparable to 2012’s “principal”) farmers. Data on primary farmers are limited, but demographic data can be found in table 52. In the original Quick Stats tool, you may access demographic information on principal producers from 1997–2012 by selecting program: “Census,” sector: “Demographics,” group: “Operators,” commodity: “Operators, Principal,” any specific data items you want, and the geographic level and year you are interested in. To access demographic information about primary producers in the 2017 Census, select program: “Census,” sector: “Demographics,” group: “Producers,” commodity: “Producers, Primary,” and the geographic level you are interested in.
- Second, you may request a special tabulation of any data not in Quick Stats using this form: https://www.nass.usda.gov/Data_and_Statistics/Special_Tabulations/Request_a_Tabulation/index.php. You will need to enter your information (name, organization, contact information) as well as the following: (i) statement of purpose for research or analysis, (ii) plans for publication and dissemination, (iii) data sources (i.e. Census of Agriculture year), (iv) geographic areas of interest (i.e., specific states), (v) items or variables needed, and (vi) lowest level of tabulation (i.e., state or county). The approval process can take up to 30 days and, if approved, will be put into a queue until analysts are assigned and can complete the request. At this time, it is unclear whether, and how, analysts are dealing with requests for tabulations involving primary producers from the 2017 Census. However, in theory, you would be able to request tabulations relating primary producers to any information from a given year’s Census of Agriculture report form (links in Table 1). Third, you may request access to the detailed microdata for any Census of Agriculture year(s). This includes access to farm-level data on every question in that year’s report form (see links in Table 1 to access report forms for your year of interest), as well as created variables (you will be provided with a full list upon approval). In order to begin this process, contact the regional USDA NASS office nearest you (https://www.nass.usda.gov/Statistics_by_State/RFO/index.php). You may only access microdata at an approved NASS regional office. You must access and analyze the data in person at a data lab in a regional office. Internet access is not allowed, and any coding you wish to bring with you (i.e., on a flash drive) must be approved prior to your visit. Different regional offices have different set-ups and capacities. Be sure to ask what statistical packages they have on their data lab computer, etc. You will be required to fill out a request to access unpublished data, with details about the specific data you are requesting, statistical packages and analyses you will be using, and the location of the data (i.e. what regional lab you wish to visit). Further details and agreements will be added as you progress in the approval process. Following your visit to the data lab, any tables you produce will be sent to the USDA NASS office in Washington, DC, for review and approval, which takes about 30 business days, before being released to you via email. Any potentially sensitive information or cells with very few respondents may be suppressed (you will receive your table with the letter ‘D’ entered in any cells that needed to be suppressed). You will need to write your own coding for primary producers in the 2017 Census of Agriculture. Use the flow chart in this article as a guide, or feel free to contact the corresponding author if you have questions.

was an anomaly or whether it marked the first point in a downward trend.

Incorrect comparisons between the 2012 and 2017 Censuses have produced misleading articles that overestimate women's success in agriculture. For example, an article in *Successful Farming* titled "Ag Census: Producers Get Older, Number of Female Farm Owners Tops 1 Million" highlights that, in 2017, "more women also have become principal producers. About 1.23 million females were principal operators in 2017, up from 969,672 in 2012, marking the first time the figure has topped 1 million, according to government data" (Dreibus, 2019). The data from the 2017 Census were only released on April 11, 2019, yet already they are being used to highlight the growing success of women in farming. For instance, Messina (2019) notes that "between 1997 and 2017, the number of women serving as the principal producers on U.S. farms grew from 209,700 to 766,500, according to the latest U.S. Department of Agriculture's (USDA) 2017 Census of Agriculture."

Despite these headlines, knowing what direction the trends for women in agriculture have taken since 2012 (or 1997) is simply not possible with the data that were collected. The number of women reported in the 2017 Census increased because of changes in how the census was written (allowing the reporting of a fourth operator and multiple principal operators). It may have also increased because the number of women in farming increased, but it is not possible to know this for sure. For example, it is possible that the number of women in agriculture decreased between 2012 and 2017, with the changes in the census data obscuring that decrease.

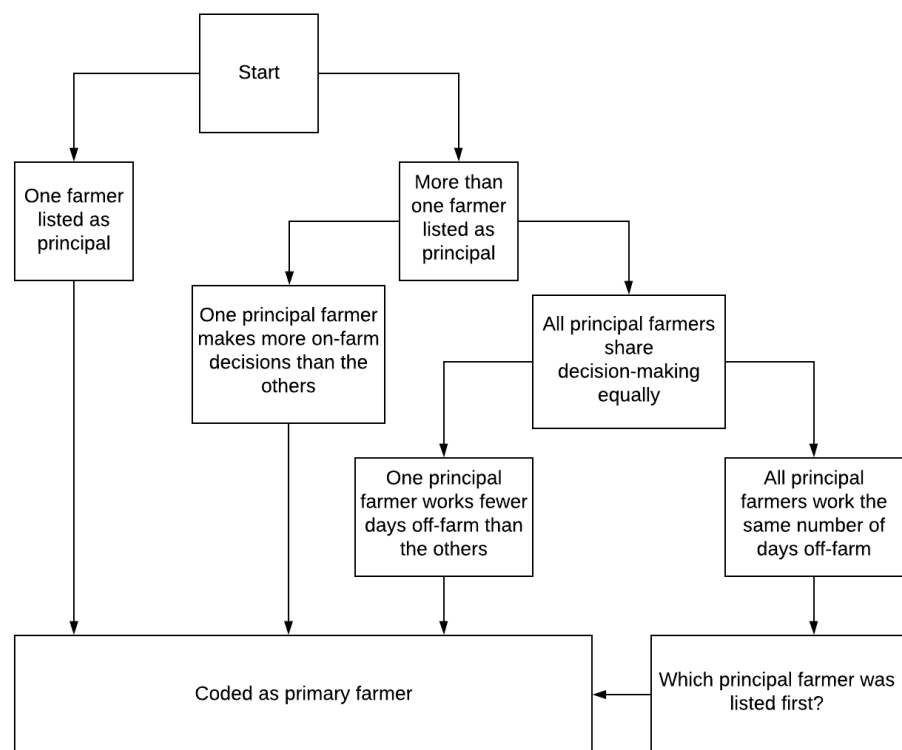
Further, without understanding the changes in the 2017 Census, there is likely a significant overestimation of women's success in agriculture. For instance, Fremstad and Paul (2016) found in their analysis of the 2012 Census of Agriculture, "Assessing full-time farmers, we show that farms operated by women earn much lower farm incomes than farms operated by men, such that the gender gap in agriculture is amongst the largest in any occupation." With the difficulty

of identifying who the principal farm operator is in the 2017 Census, a similar assessment of this most recent data might conclude that farms operated by women now earn farm incomes much closer to those of farms operated by men; however, this may be because women can now be listed as principal operators on farms where men are also listed as principal producers. The general rush to proclaim the triumphant success of women farmers is not merely inaccurate: It could hurt women's chances of succeeding in agriculture by pulling educational programming targeting them as an underrepresented group.

Suggestions for Comparing 2017 Data to Previous Data

Despite the challenges of comparing demographic trends across time, researchers can answer other important questions about demographic trends in farming using the Census of Agriculture data. Comparisons across periods, however, should be used only with appropriate caveats, as outlined above. It is possible for researchers who access the full datasets to compare across time to a certain extent. To account for the incompatibility of the "principal operator" variables in the 2017 and earlier censuses, the USDA created a variable termed "primary producer." This variable is calculated from 2017 Census data and is

Figure 4. Visualization of Coding Suggested by the USDA to Create "Primary Producer" Variable



Source: [U.S. Department of Agriculture \(2017\)](#).

intended to be comparable to the previous years' "principal operator" term. Specifically, "primary producer" (see Figure 4) is coded using if/then statements based on who makes the most decisions on the farm, followed by who works the fewest days off the farm, and finally implementing a tiebreak based on the order in which producers are listed.

While this variable is intended to be directly comparable to "principal operators" from previous censuses, there are some issues with this comparison. In particular, in past census years, operators *self-designated* principal operators. In the 2017 coding scheme, principal producers are determined objectively (i.e., the actual farmers are not involved in the assignment). Therefore, some producers who do not consider themselves principally farmers, or who are not considered principal farmers by the individual completing the survey, would not have been listed as such before 2017 but may nonetheless be designated a principal producer using the 2017 coding. This is especially relevant for women farmers, who research shows may not apply the label "farmer" to themselves despite being closely involved with the farm operation (Beach, 2013; Bell et al., 2004; Brasier et al., 2014). Therefore, the most accurate way to compare principal operators would be to apply the same coding that was used for the 2017 Census across all years. Unfortunately, this is not directly possible as 2017 was the first year in which detailed questions were included about the on-farm decision making of each operator.

Conclusion

The changes in data collection in the 2017 Census of Agriculture make comparison difficult with the previous censuses. Specifically, in 2017, the Census of Agriculture allowed for up to four operators to be reported, all of whom could be designated as a principal operator. This is a departure from previous years; from 1974 to 1997, only one operator could be listed, while from 2002 to 2012, three operators could be registered, with only one of these designated as the principal operator.

For More Information

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Box 3. Suggested Language to Explain 2017 Changes to the Census

Changes to the 2017 Census of Agriculture offer us the most comprehensive and detailed look we have had at U.S. farmers and ranchers; however, these changes also mean it is simply not possible to compare 2017 Census of Agriculture data to previous years' data. Specifically, in 2017 the number of people on each farm who could be listed as a "farm operator" increased from three to four. In addition, the role of "principal operator," previously a role for a single person on each farm, was replaced with "Principal Producers" a role that 0–4 people on each farm could claim.

Although the changes in the 2017 Census represent a better understanding of farmer demographics and the composition of U.S. farms and ranches, these modifications reduce the ability to estimate trends accurately using previous data. Also, it had been the source of misleading articles that incorrectly compare the 2012 and 2017 Censuses and potentially overestimate women's success in agriculture.

To compare the "principal operator" variable from the 2002–2012 Census with the "primary producer" variable from the 2017 Census, the USDA created an algorithm based on who makes more decisions and work more days on the farm. While this new variable helps resolve the problem, they are not directly comparable. In past census years, operators self-designated principal operators. In the 2017 coding scheme, principal producers are determined objectively.

As a result, researchers, journalists, and policy makers must be cautious in making claims comparing farmer demographics from the 2017 Census with previous censuses. Also, they should make comparisons across periods and present their results with appropriate caveats.

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